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Development of Glycine coated Magnetic Nanoparticles (GMNPs) advance drug delivery system against visceral leishmaniasis

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Background: The treatment options for visceral leishmaniasis (VL) caused by *Leishmaniasis donovani* are limited and unsatisfactory at present. The drugs available are mostly parenteral and have serious side effects. Development of glycine coated magnetic nanoparticles a based nanocarrier has been carried out which can enter into macrophages and deliver antileishmanial drug to target site of macrophage.

Methods & Materials: We have developed the MNPs drug target system against visceral leishmaniasis. The coating of Fe_3O_4 nanoparticle has been done with glycine was carried out in situ during co-precipitation of Fe 2+ and Fe 3+ ions in basic medium. The terminal amino acid on the shell of the magnetic nano carriers allows us to create functionalized exteriors with high densities of organic moieties (both amine and carboxyl) for encapsulation of drug molecules Synthesis and size confirmation of GMNPs-AmpB has been carried out by different sophisticated instruments such as XRD, FTIR, TEM, DLS-Zeta, VSM, TGA and CHNS.

Results: Synthesis of Fe_3O_4 nanoparticle has been done with coating of glycine. Size of nanoparticle showed that particle size in 10-15 nm and closed to spherical in shaped. Furthermore 90% loading affinity of GMNPs for AmpB drug and their Higuchi drug release model confirming that the AMP release process is diffusion controlled, release rate of AmpB is higher at lower pH. During in vitro study, efficacy of GMNPs encapsulated AmpB formulation against conventional AmpB IC50 value are 4 ng/ml and 9 ng/ml was observed for nano-AmpB and AmpB respectively, significantly more than two fold efficacies of GMNP encapsulated AmpB has been increased. There was a highly significant reduction in the total parasite burden in spleen in the treated groups, 94.53% parasite inhibition has been seen with GMNPs encapsulate AmpB whish is showing very high % as compare to AmpB with 75.73% parasite inhibition.

Conclusion: The studies, therefore, could provide another useful tool for successful development of *GMNPs* and an *in vitro and vivo* approach to designate nanocarriers system with distinctly improved bioavailability, high efficacy, and premature degradation of drug and to overcome side effect of antileishmanial drug.

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ITS Typing, a potent genetic tool for discrimination of Trichomonas vaginalis isolates

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Background: Genetic variability, virulence factors and drug resistance mechanisms of *Trichomonas vaginalis* are poorly understood issues about the parasite. The aim of this study was to determine internal transcribed spacer (ITS) types of available *T. vaginalis* ITS sequences in Genbank and to compare with ITS types of *T. vaginalis* isolates from Aydin, Turkey.

Methods & Materials: *T. vaginalis* isolates in the present study were obtained from 20 patients with vaginitis at Adnan Menderes University, Research and Training Hospital Parasitology Department between 2010 and 2014. ITS regions were amplified and sequenced from a total of 20 *T. vaginalis* isolates.

Results: The sequences were compared and over 99% homology was observed. Of 20 isolates 5 were identical to the reference which was defined as ITST1. A total of 13 strains had A58 deletion (ITST10), and one strain had C203T mutation (ITST2), and one strain had both A58 deletion and C203T mutation (ITST11). ITS typing of 34 *T. vaginalis*ITS sequences on Genbank was also done and a total 11 ITS types including 2 from present study were defined. Our study showed that ITST10 was the most common ITS type in Aydin, Turkey. Based on sequences in Genbank the ITST1 was the most common type in the world (44.4%), and isolates were reported from different countries.

Conclusion: ITS typing is an important tool for molecular epidemiology analysis and for determination of dissemination of *T. vaginalis* clones.

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